All Systems Cogeneration, Inc.

Background

All Systems Cogeneration, Inc. is a developer and operator of small-scale cogeneration systems. Their combined heat and power plants help meet the electrical and thermal needs of the host facility while reducing energy costs. The company has installed thirteen internal combustion engines at eleven different retirement centers throughout the state of New York.

Project Description

The CHP systems consist of a 60 kW internal combustion engine (manufactured by Coast Intelligen, Inc.) with heat recovery from the engine block, engine oil, and exhaust manifold. The engines burn natural gas and use 3-way catalysts to lower NO_x emissions. The electricity generated by the engines directly feeds into the main distribution panel of the facilities, and the recovered thermal energy serves individual buildings. Thermal output is used for space heating, production of domestic hot water, heating for swimming pools and Jacuzzis, and for air conditioning through a steam absorption chiller.

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Cogeneration Plant Operating Data for 1999*

Project Design Capacity (MW_e)	0.78
Power to Heat Ratio	0.5
Total Net Efficiency (HHV)	76%
% Fuel Savings[1]	11% (140 metric tons of carbon)
Effective Electricity Efficiency (HHV)[2]	65%
% NOx Decrease[3]	79% (12 tons)

∗*Data based on 8,500 annual hours of operation*

Success Strategy

All Systems focuses on retirement centers because they are ideal locations for CHP. They have nearly constant thermal and electric demands and sizing the projects to be thermally base loaded maximized economics. All Systems incorporates 14,000 gallons of thermal storage in at each facility to take full advantage of heat recovery. By opting not to sell electricity back to the grid, All Systems avoids interconnection issues.

[1] Savings based on 50% efficient electric and 83% efficient thermal generation with natural gas as the primary fuel.
[2] Effective Electric Efficiency = (CHP power output)/(Total energy input to CHP system – total heat recovered/0.83). Assumes thermal output provided at 83% efficiency.
[3] Compared to electric emissions of 3.6 lb NO_x/MWh (1998 national average) and boiler emissions of 0.1 lb NO_x/MMBtu.

Benefits

The projects implemented by All Systems Cogeneration demonstrate the use of combined heat and power at institutional facilities. Besides saving money for clients by limiting power purchases from the grid, the cogeneration facilities also provide a positive emissions benefit. Compared to separate heat and power, the company's eleven cogeneration systems annually save a combined total 10 million standard cubic feet of gas, equivalent to 570 tons of CO_2. The carbon reduction is comparable to the planting 160 acres of forest or displacing the annual greenhouse gas emissions from 50 households. The combined NO_x reductions are equal to the annual emissions from 600 vehicles.

In March 2000, the United States Environmental Protection Agency and the Department of Energy recognized the pollution prevention benefits of these CHP facilities with a CHP Certificate of Recognition. For more information on ENERGY STAR® CHP awards, please click here.